W. H. Thayer M.D. with the
Burge (J. H. H.) Author's compliments

PRACTICAL REFLECTIONS

ON THE

NATURE AND TREATMENT

OF

CROUP.

BY

J. H. HOBART BURGE, M. D.,

SURGEON TO THE LONG ISLAND COLLEGE HOSPITAL, BROOKLYN, N. Y.

[*REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, JULY*, 1870.]

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1870.

Maudsley on the Mind.

The Physiology and Pathology of the Mind. By HENRY MAUDSLEY, M. D., Physician to the West London Hospital. 8vo, pp. xv–442 (tinted paper). . . . Cloth, $4.00

Dr. Maudsley's aim in the preparation of this volume has been to treat of mental phenomena from a physiological rather than, as has hitherto been the habit, from a metaphysical point of view, and in his history of the inductive method, as applied to the interrogation of the mind, he shows conclusively that self-consciousness—the favorite resort of the schoolmen—is inadequate, contradictory, and unreliable. No book of the present day, devoted to the study of the mind, has attracted more attention or caused more comment than this. It is one of those works which mark the beginning of a new era in the study of mental science, and at the same time it is conceded on all sides to be, in its practical portions, a most reliable guide for the diagnosis, description, and treatment of insanity.

"Dr. Maudsley has had the courage to undertake, and the skill to execute, what is, at least, in English, an original enterprise. This book is a manual of mental science in all its parts, embracing all that is known in the existing state of physiology. * * * Many and valuable books have been written by English physicians on insanity, idiocy, and all the forms of mental aberration. But derangement had always been treated as a distinct subject, and therefore empirically. That the phenomena of sound and unsound minds are not matters of distinct investigation, but inseparable parts of one and the same inquiry, seems a truism as soon as stated. But strange to say, they had always been pursued separately, and been in the hands of two distinct classes of investigators. The logicians and metaphysicians occasionally borrowed a stray fact from the abundant cases compiled by the medical authorities; but the physician on the other hand had no theoretical clew to his observations beyond a smattering of dogmatic psychology learned at college. To effect a reconciliation between the Psychology and the Pathology of the mind, or rather to construct a basis for both in a common science, is the aim of Dr. Maudsley's book."—*London Sat. Rev., May* 25, 1867.

"The first chapter is devoted to the consideration of the causes of insanity. It would be well, we think, if this chapter were published in a separate form and scattered broadcast throughout the land. It is so full of sensible reflections and sound truths, that their wide dissemination could not but be of benefit to all thinking persons. In taking leave of Dr. Maudsley's volume, we desire again to express our gratification with the result of his labors, and to express the hope that he has not yet ceased his studies in the important field which he has selected. Our thanks are also due to the American publishers for the very handsome manner in which they have reprinted a work which is certain to do credit to a house already noted for its valuable publications."—*Quar. Journal of Psychological Medicine and Medical Jurisprudence.*

"Then follow chapters on the diagnosis, prognosis, and treatment of insanity, each characterized by the same bold and brilliant thought, the same charming style of composition, and the same sterling sense that we have found all through. We lay down the book with admiration, and we commend it most earnestly to our readers, as a work of extraordinary merit and originality—one of those productions that are evolved only occasionally in the lapse of years, and that serve to mark actual and very decided advances in knowledge and science."—*N. Y. Medical Journal, January*, 1868.

"This work of Dr. Maudsley's is unquestionably one of the ablest and most important, on the subjects of which it treats, that has ever appeared, and does infinite credit to his philosophical acumen and accurate observation. No one has more successfully exhibited the discordant results of metaphysical, physiological, and pathological studies of the mind, or demonstrated more satisfactorily the uselessness of an exclusive method, or the pressing need of combined action, and of a more philosophical mode of proceeding."—*Medical Record, Nov.* 15, 1867.

"In the recital of the causes of insanity, as found in peculiarities of civilization, of religion, sex, condition, and particularly in the engrossing pursuit of wealth, this calm scientific work has the solemnity of a hundred sermons; and after going down into this exploration of the mysteries of our being, we shall come up into active life again chastened, thoughtful, and feeling, perhaps, as we never felt before, how fearfully and wonderfully we are made."—*Evening Gazette.*

"Dr. Maudsley's treatise is a valuable work, and deserves the careful consideration of all who feel an interest, not only in general metaphysical facts, but in those manifestations which mark the boundaries between health and disease in the human mind."—*Providence (R. I.) Journal.*

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CROUP.[1]

Croup was doubtless known to Hippocrates, but we find no clear description of it earlier than that of Blair in Scotland, 1718. Home, of Edinburgh, also gives it a distinct place in the family of diseases in 1765. After which time it is found under a great variety of names in nearly all works on general practice; and many monographs of more or less merit have appeared from time to time.

Of all the titles given to this disease I prefer laryngo-tracheitis, as expressive of the fact that it is an inflammation of the larynx and trachea. In this I but conform to the

[1] Read before the King's County Medical Society, November 16, 1869.

view of Cullen, Home, Dickson, Peaslee, Condie, and a host of others.

This opens at once the question, What is essential to an attack of croup? and, if I were to pause for a reply, the answers which would be given, by the different members of any medical society of this size, would sufficiently indicate the necessity of a thorough discussion of the subject, and a better understanding of each other's views.

Never shall I forget the confusion of sentiment and expression which existed at a session of the New York State Medical Society seven years ago, when this subject was introduced, in connection, I think, with a paper by Dr. Bissell, of Utica, on diphtheria. I am sure a majority of those present felt a painful sense of the ludicrous. Just such a scene occurred in this society several years ago, when a creditable paper was read by Dr. Crane.

Some insist upon several varieties, and so call every attack *croup*, which has for its main feature *dyspnœa* or threateniug suffocation, which dyspnœa depends on obstruction in or of the larynx. Others restrict the title *croup* to those cases in which a false membrane exists. At first sight this would only seem to create a war of words—a confusion in our means of communicating our views to each other.

This, however, does not constitute the main difficulty; for the question is one of pathology and not of terminology.

One class of medical men hold that membranous croup is a distinct and fearfully-fatal disease, having no connection whatever with the other varieties so called; while another class contend that these varieties are only different grades and states of the same affection. Of two medical men equally well informed, one tells us that, while membranous croup is almost always fatal, the spasmodic and simply inflammatory will almost as surely recover even without treatment; the other tells us that they are in essence the same thing, and that the milder varieties, as he calls them, will, unless resolution take place, go on to diphtheritic deposits or to death without this symptom.

All agree as to the propriety of dividing croup cases into

true and *false*, but one class restricts the title *pseudo-croup* to laryngismus stridulus[1]—a purely spasmodic affection—while another includes in this category all the inflammatory cases in which false membrane does not appear.

One or the other of these distinct views is held positively and defended earnestly by comparatively few of the profession; while the great majority either suspend judgment on the controverted points, or hold loosely and in a vacillating manner whatever views they may be said to have on the subject.

Practically, the great mass of the profession, in common with the laity, call every case croup in which an obstruction in or of the larynx (not caused by whooping-cough, œdema of the glottis, asthma, or a foreign body) gives rise to dyspnœa and threatened suffocation, and, when we are called to such a case, be the same catarrhal, spasmodic, inflammatory, diphtheritic, or false-membranous, laryngeal, tracheal, or bronchial, sthenic or asthenic, mild or severe, examine, sift, and compare the symptoms as we may, inform ourselves as thoroughly as possible as to the history of the attack, the susceptibilities of the patient, and all other points of interest—still we are anxious as to the results.

Why is this, if the distinctions are practically as clear as they are theoretically? .

For the sake of perspicuity I will state my conclusions first, in several propositions, and then say a few words upon each:

Proposition I.—False croup is a simple spasmodic affection, very well named laryngismus stridulus. It is rarely if ever fatal, and would hardly excite apprehension if it were always possible to distinguish it, and to feel sure that there

[1] In the use of this term, I do not forget that it was applied by Dr. Mason Good to that mysterious and sometimes chronic affection which the Germans call Thymus Asthma, and which Gooch denominated "child-crowing." The difference between this and the *false croup* to which I allude is, that this seems dependent upon some organic lesion affecting directly or indirectly the recurrent laryngeal nerve; while the pseudo-croup, which I would carefully distinguish from this, as well as from laryngo-tracheitis, is a transient spasmodic affection, depending without doubt upon the reflex action of some remote irritation, as dentition, indigestible food, and the like.

were no inflammatory complications. It is always sudden, generally occurs in the night, is frightful to witness, and distressing to experience.

Remarks.—Those who pride themselves on great accuracy of diagnosis, would hardly allow that it were possible to confound this mild disease with true croup. Yet it is so confounded constantly, and so heroically treated, especially by the non-professional, who manage a large proportion of these cases, that a multitude of lives have doubtless been unnecessarily sacrificed, and the cases charged to the account of "membranous croup." It is true that the points of difference between this mild affection and the grave malady under discussion are sufficiently numerous and diagnostic when they can be made out, which, in the mild affection, is generally after needless medication has been resorted to. To show how easy it is to be in doubt, in real practice, in the middle of the night, when all is excitement and anxiety, and where it is next to impossible to get a light to shine into the fauces even, and where also it is quite impossible to learn whether the child was perfectly well on going to bed or not, I will quote two short paragraphs from that interesting and accurate work of Condie, on diseases of children. After having described the usual course of true croup in its different degrees of severity, he says:

> In other cases, however, the disease commences much more abruptly, and proceeds with great rapidity and violence. The patient, who retired to bed apparently in perfect health, is suddenly awoke from his sleep with a violent fit of loud, ringing cough, etc., etc.

Ten pages further on he says:

> True croup always commences gradually, the severer paroxysms never occurring until the disease has lasted for at least *some short time.*

There is no real contradiction here. I make these quotations to show how the cases apparently run together at the very time when the practitioner must decide quickly what to do. Dr. Jacobi, of New York, after making the clearest possible distinctions between the true and false, uses the follow-

ing language: "This much may be stated here, and practice will admit the fact, that the affection will frequently (especially when there is no epidemic diphtheria) commence by pseudo-croup, and afterward assume a more formidable character." He says also:

You may see in the mouth a catarrhal proliferation, or croupous condensation of the epithelium, on the tonsil a diphtheritic deposit, embedded in the tissue, on the larynx and trachea a plain croupous deposit, and in the bronchi a muco-purulent secretion, and again, under the same endemic and epidemic influence, you will find a case of catarrh, a case of croup, a case of diphtheria, a case of follicular exudative amygdalitis, in the same family, in the same week. Thus it appears that, in the long list of morbid conditions met with, catarrh on the one side, diphtheria on the other, are but the starting and terminating points, between which all the different shapes and forms may be registered according to their dignity; their modifications depending on individual local, endemic, and epidemic influences; the only form which is perhaps, and perhaps only, to be excluded, being the necrotizing diphtheria.

Again, Watson, whose work on Theory and Practice (excepting his therapeutics) is one of the best and decidedly the most popular that ever was published, so expresses himself as to call forth the following criticism from his special admirer, Dr. Condie:

Under the head of Child-Crowing or Spurious Croup, Dr. Watson has confounded two very distinct diseases. One occurs most commonly entirely independent of inflammation in any portion of the air-passages, and consists simply in a spasm of the glottis—the results of a reflex action, through the excito-motory property of the nervous system, of various irritations of the gums, or digestive apparatus, or of the action of external agents, or mental emotions. This is the affection known as laryngismus stridulus. The other disease differs in nothing from genuine croup, excepting that the inflammation is less intense, and seldom extends into the trachea, the exudation is of a more muco-form character, seldom adhering long enough to the inflamed mucous surface of the larynx to become converted into false membrane. This form of laryngeal disease (continues Condie) has been termed *catarrhal croup—false croup*, and, by some, *spasmodic croup*. We prefer the name spasmodic laryngitis given to it by Rilliet and Barthes.

It is true, then, upon the testimony of Condie, that Watson, an authoritative teacher in the medical Israel, may and actually does confound these different affections. If this be

so, can we expect greater accuracy among those who have less knowledge and less experience? At the risk of seeming prolix, I must beg you not to understand me as detracting in the slightest degree from the importance of those distinctions which are made and which actually exist between the purely spasmodic and the inflammatory affections of the larynx and trachea. I know very well that the simply spasmodic will almost always recover, that the mildly inflammatory will generally recover, and that those which go on to the formation of pseudo-membrane do generally die. I know also that when the death or the recovery has taken place, and you have the whole history of the case before you, it is almost always the easiest matter in the world to say to which class it belonged. Moreover, in exceptional cases it is easy to make an early and positive diagnosis; but the idea which I wish clearly to express in this connection is, that *generally*, when you are called to a case of simple spasmodic croup, with the imperfect history that you are able to get, and the imperfect examination that you are able to make, you cannot feel sure that there is no inflammation; and, if there be inflammation, you cannot feel sure that it will not go on to exudation, coagulation, and ultimate suffocation: and the practical point is this, that too often the *worst* is assumed to be probable, and the treatment is directed accordingly.

Proposition II.—True croup is an inflammation of the tissues lining the larynx and trachea, and sometimes extending to the bronchial ramifications. It may be superficial, involving only the mucous membrane, or it may involve the subjacent areolar tissue.

Remarks.—There is no reason to regard this inflammation as in any sense specific; it is a simple inflammation, arising generally from ordinary atmospheric causes. It does not seem remarkable that children should be more susceptible to these influences, and therefore more liable to croup, than those of mature years. Nor is it difficult to see why children at the breast are less liable than after weaning; they are better protected from cold and damp.

Stokes, Bouchut, and Guersant, speak of it as contagious, or probably so, but the verdict of the profession is against this

idea. It has often been epidemic, as we might expect it to be, just as influenza is, and from like causes; but in such a fatal prevalence as that reported by Tarrand, where, within a small compass and in a short space of time, in 1827, sixty were attacked, and none escaped death, and also in those cases where good observers have pronounced it contagious, I strongly suspect the disease was a true diphtheria. It is much easier to account for so fearful a mortality upon this theory of a specific poison entering the system in a necessarily fatal dose, than to understand how so many cases of croup could occur, and have no mild case among them.

In speaking to a learned society, such as I have the honor to address, it is not necessary that I should detail the symptoms of a disease so familiar. I shall only refer to them incidentally as I proceed. The spasmodic element exists in all cases of croup, though in exceedingly variable degrees. The febrile excitement is seldom great, and sometimes hardly observable.

Proposition III.—Effusion of plastic lymph, coagulation, and consequent formation of false membrane, occur in about one-sixth of all the cases of true croup.

Remarks.—It is so common to speak of membranous croup, that it is difficult to get out of the unscientific habit of regarding the occasional symptoms here referred to as diagnostic. Bouchut, Good, Guersant, Brettoneau, and many others, so regard it. Dickson says it does not always exist even in the worst cases. Chapman often failed to find it in the cadaver. In a fatal case which I attended eighteen years ago, in conjunction with Dr. Sweet, of New York, we made an autopsy, and no membrane existed, though a more protracted and painful death from suffocation was never witnessed. Dr. Peaslee says:

> We need not, for any practical purpose, admit an inflammatory and membranous croup, any more than we should make the same distinction in regard to pleuritis or peritonitis. Croup is always inflammatory, and some cases are accompanied by the formation of a false membrane. The latter should not affect the treatment of the disease as an inflammation, but merely because of its mechanical effects. Its occurrence cannot be predicted in any case, until it is actually seen, and this is not possible in most cases, even when it is developed at the very outset of the disease.

It may occur in *any case of laryngo-tracheitis*, and our anxiety always testifies to our faith in this fact. It will not occur in five cases out of six. Dr. Peaslee is therefore right, in my opinion, in maintaining that it ought not to be included in the definition of the disease, or be expressed by its name. To regard the false membrane as diagnostic, and therefore as indicating a disease separate and distinct from inflammatory croup, is not only to erect a symptom which is sometimes present and sometimes not, into a disease, but it is practically pernicious, since it leads us to cry, "*Peace, peace*, where there is no peace," in the inflammatory cases, and to neglect, perhaps, the very means which are necessary to prevent such cases from becoming membranous.

Adults have more judgment in expectorating, and thus getting rid of the products of inflammation before they have time to become coagulated and solidified. Moreover, I suspect that an inflammation of the larynx which an adult would carry with him to his daily avocation, and perhaps never speak of to any one, would, at the impressible age of two years, cause a spasmodic complication which might destroy life.

Statistics of croup-cases are generally worthless, because you cannot tell, unless you have a minute report of each, what proportion are mild and what severe; what kind of cases were included as true and what set down as false; what influence early treatment had in preventing fatal symptoms, and in cutting the disease short before it merited to be called a severe case.

With regard to its fatality, Prof. Ware, of Boston, reports 90 per cent.; but, then, it must be remembered that he rigidly restricted the title "croup" to those cases in which that terribly fatal symptom—the formation of false membrane—had actually occurred. If all the cases of laryngo-tracheitis which he treated of had been included in the estimate, it is not probable that the percentage of deaths would exceed 40. Dr. Jacobi says 75 is highly favorable; yet it is not quite clear upon what basis he makes his estimate. Upon the best evidence which I can bring to bear on the subject—if I were to hazard an opinion—I should say that, including all well-

marked inflammatory cases, not 20 per cent. are lost when treated judiciously.

PROPOSITION IV.—The popular treatment of croup, in all its phases, has been and still is, in my opinion, severe and full of danger.

Remarks.—I by no means intend to assert that I alone treat this disease on conservative and safe principles; it is so treated by thousands throughout the world. Nevertheless, the great number of cases are vomited before the doctor seethem (often with tartar-emetic), and approved text-books on practice say "That's right, give the child another dose." Cheyne says tartar-emetic is the sheet-anchor. Dr. John Elliotson has "no doubt that he has generally failed with antimony, because he has used it timidly, and quotes almost approvingly the experience of a medical man who gave it till twenty-seven grains were swallowed, and tetanic spasms produced. In *Braithwaite's Retrospect*, January, 1857, several English physicians indorsed Dr. Elliotson's views, but Dr. Prior, of Tewksbury, says that "as the result of extensive experience he can testify" that, "if such heroic practices be carried out, the deaths from this cause would be immensely increased."

As an emetic in croup, Condie says a majority of physicians prefer tartar-emetic.

Watson begins his remarks, on the treatment of croup, with this sentence: "The three remedies most requiring consideration are bloodletting, tartarized antimony, and calomel."

Mr. President, I join in no tirade against these time-honored and valuable agents, but I believe the time has come when we have better means at command to meet the indications which arise in the course of this disease. Bloodletting, though by common consent abandoned, was almost as universally recommended even into the present century. Calomel is hardly ever given now, except in a cathartic dose; but antimony, the most dangerous of all, still clings to its false reputation. The people give comp. syrup of squills, and call it croup-syrup. If the child dies by syncope, of absolute prostration and exhaustion, as I have seen them die after domestic treatment, the friends say, "What a terrible thing this membranous croup is!" and the doctor arrives in time to

give a certificate, when perhaps laryngismus stridulus is the worst name that he can conscientiously write. Dr. Horace Green says: "The injudicious use of tartarized antimony in the diseases of young children has destroyed more lives than it has been instrumental in saving." Dickson begins mildly—gives a dose of paregoric; "afterward," he says, "an emetic is demanded, and if not relieved by the first emetic and the lancet, repeat the emetic; then comes the cathartic, salines preferred." He says, "The invading stage of croup is under domestic control." Twenty years ago Prof. Ware, of Harvard University, after deploring the loss of thirty out of thirty-three cases of "membranous croup," wrote as follows: "The method in common use of treating this disease requires careful reconsideration." He also asks: "If the mode of treating croup commonly adopted does no good, are we sure it does no hurt?" Many authors advise that, besides the occasional emetic, nauseating doses of antimony or of ipecac. be continually given. This somewhat anticipates the subject of—

Proposition V.—Emetics and nauseants, as a rule, do harm.

Remarks.—The only exceptions that I would make to this rule are, that ipecac. may be given in a single emetic dose, when the stomach is full, particularly if indigestible food has just been taken, and sulphate of zinc or sulphate of copper, or some other non-depressing emetic, when death threatens from simple laryngeal obstruction, and when there seems reason to hope that the false membrane may be detached and thrown off by its mechanical action. Nauseants and emetics, except for the purposes just indicated, cannot reasonably be expected to do good; surely the spasmodic efforts and temporary cerebral and cervical congestions which attend the act of vomiting cannot lessen the laryngeal inflammation. Again, they debilitate and rapidly unfit the little sufferer to contend successfully with his great enemy, for Watson says that "in fatal cases the false membrane is sometimes found detached from the larynx, so that it might have been expelled without much forcing or difficulty, if the child could have sufficiently inflated its lungs, and the *requisite muscular power had remained.*"

Conserve, then, this muscular power. Again, emetics, nau-

scants, and expectorants, fill the lungs with mucus, at a time when it is extremely difficult to get rid of it, and when it can have no other effect than to act as an additional barrier to the little oxygen which reaches the blood. I have made an exception in favor of certain mechanical or non-depressing emetics in the last stages of croup, with a view to the detaching and expelling of the false membrane. I will finish here what I have to say upon that point. It is true that the dilatation of the larynx occasioned by the act of vomiting is well calculated to favor the detachment of the dreaded false membrane. Dr. Meigs, of Philadelphia, prefers for this purpose alum, which may be given in five to ten grain doses. Dr. Hubbard, of Maine, uses and has great faith in turpeth mineral, yellow sulphuret of mercury, two to three grains repeated in fifteen minutes if it fails to operate. Sulphate of copper, first introduced by Serlo, has been given by Schwabe in fifty cases, a grain and a half to four grains every hour, eight to twelve doses. Horner Koff reports ninety-nine cases, with seventy-seven recoveries, in which he used this remedy. It is also highly recommended by Berrignier, Trousseau, and Luzinsky. The sulphate of zinc is also recommended by many, dose five to fifteen grains.

Thus far, my remarks on treatment have had reference mainly to what should not be done, and I cannot sum up this branch of my subject by any words more apt than those of Prof. Ware, published twenty years ago. After the fearful experience to which I have already alluded, he proposed to treat croup without depletion (except, perhaps, a few leeches), without vomiting, without purging, without blistering, without antimonials, without ipecac., and without any of those nauseating remedies which had been usually resorted to. Although Dr. Ware was the highest living authority at that time, the world was not ready for so great an innovation.

Had the treatment which he proposed been as sound as this negative proposition, it would probably have exerted a more abiding influence upon the profession.

It has excellent features, and, as it consists of three points only, I will rehearse them: 1. Full influence of opium, combined with calomel. 2. Constant application of warmth and moisture to the neck, and of mercurial liniment, slightly stim-

ulating. 3. Constant inhalation of the vapor of water. A vast improvement on the general practice of his day.

The course of treatment which I adopt, and heartily recommend, may be stated in a few words :

Proposition VI.—If the stomach be full, or indigestible food have been recently taken, a single emetic may be given. It is, however, in my experience, rarely required.

Remarks.—The emetic here is not so objectionable as under any other circumstances, because the form of disease which arises from reflex action after a full meal is generally spasmodic. If, however, there should chance to be inflammatory action commencing, the expectorant effect of the remedy will be mainly over before the height of the disease would be reached. Even here three to ten grains of the sulphate of zinc would probably be a better choice than ipecac.

Proposition VII.—Give a dose of bromide of potassium sufficient to quiet all spasmodic action—four to twenty grains, and repeat every six hours.

Remarks.—It is supposed this remedy may also be useful, to some extent, in retarding or preventing the deposit of false membrane, its solvent action upon such deposits being well known to the profession. Two grains in an ounce of water will liquefy a false membrane in a few hours. If restricted to its antispasmodic property only, I would never omit it, since the spasmodic element is more or less marked in all cases of true croup.

Hydrocyanic acid, first introduced by the Italian physicians, is recommended by Horace Green. Wenett gives one grain of musk every hour. Dickson relies upon paregoric. I regard the bromide as more reliable than either of these.

Proposition VIII.—Give one-half to one teaspoonful of liquor calcis every hour or every half-hour.

Remarks.—The alkalies, generally, are solvents of false membrane, and lime-water is one of the pleasantest and most manageable for internal use. Eggert regards carbonate of potassa as almost a specific. J. D. Griscom, of London, gives the iodide of potassium. J. Gottstein, of Breslau, speaks of using repeated injections of lime-water into the nares in diphtheria. I do not know whether the lime-water which I ad-

minister acts through the circulation directly upon the inflamed surface, or whether its action is restricted to the epiglottis and the parts above; at any rate, I would not be willing to relinquish it, except, perhaps, for its equivalent in the carbonate of potassa.

Proposition IX.—Allow the patient to inhale the vapor of slacking lime.

Remarks.—The credit of this last expedient is due, I believe, to Dr. Geiger, of Dayton, Ohio, who reports great success.

Dr. B. B. Wilson, of Pennsylvania, with the same remedy, saved two cases while *in articulo mortis*. Dr. Wilde, of this society, reports two terrible cases, which I saw with him, and which were saved by the lime inhalations and the bromide of potassium. The best method is to slack the lime in an open pail or tub. Care is requisite not to annoy, frighten, or scald the patient. Some children are so much pleased with the relief it affords, that they seek it voluntarily after the first experience; others oppose its use, as they do every thing else. The confidence and coöperation of the patient are important, since all excitement increases the circulation, and the necessity for greater quantities of oxygen to properly arterialize the blood. The simple vapor of water has been and is extensively used and recommended, and some have seriously questioned whether any thing but moist air reaches the larynx when we employ the slacking-lime. I am not alone in contending that lime is inhaled, and that its effect is superior to that of vapor alone. Even at the temperature of 212° F., a pint of water will hold in solution five and a half grains of lime, and this is sufficient to give an alkaline reaction to the vapor which arises therefrom. If the patient resist violently, so that its immediate inhalation is rendered impossible, lime may be freely slacked in the room to such an extent as to keep the air constantly moist. I have used lime-water atomized by the spray-producer, and believe it objectionable in this disease. It annoys the patient, and condenses frigidly upon the face and neck.

Proposition X.—Take equal parts of impure carbolic acid and glycerine. Pour upon a teaspoonful of this mixture, in an open basin, a pint of boiling water. Renew this every four

hours, and allow the patient to inhale its vapor for a few minutes. Let the preparation stand in the room till renewed.

Remarks.—Lime-water and carbolic acid, though possessing opposite chemical properties, are both useful, and both at the same time, though not at the same instant. I have observed, while using carbolic acid in surgical practice, that, whenever venous blood was touched by it, it instantly became arterial. Lime-water dissolves the false membrane, to use a paradox, before it is formed, while it is also gently stimulating and alterative to the inflamed surface. Carbolic acid acts directly upon the nerves and vessels of the larynx, trachea, and bronchi, aiding in the oxygenation of the blood and in the exfoliation of the diphtheritic deposit. It is also a valuable disinfectant, and will destroy any diphtheritic poison that may be lurking about unawares.

Proposition XI.—Give an enema of strong hop-tea, at least twice a day. If the child be costive, add to the first enema one or two teaspoonfuls of table-salt.

Remarks.—The injection is given to unload the vessels, and to give the diaphragm free play.

Hop-tea is chosen on account of its sedative and antispasmodic influence. I avoid cathartics because of their disturbing and debilitating effects. A simple cathartic dose of calomel—ten to twenty grains—has been highly recommended; and, though I would not ordinarily give it, I can see no great objection to its use. I have been told that the late Francis W. Johnston, of New York, would not treat a case without it. He never *repeated* the dose. Had not Rush seen some good effect from its use, he could hardly have said, "Calomel is as efficacious in croup as bark in fever."

Proposition XII.—Use externally some gently stimulating and anodyne liniment. I prefer linimentum saponis, slightly ammoniated, ℥ ij; tinct. rad. aconiti, ℥ ss. Apply this with a camel's-hair pencil.

Remarks.—Do not bind the liniment to the neck with cloths of any kind; it is not only liable to vesicate, but it adds greatly to the discomfort of the little sufferer to have the neck in any way pressed upon, or restricted in its movements. On this account the weight of poultices makes them

objectionable. Tincture of iodine, either simple or compound, may be substituted for the liniment. Turpentine is a good application. My friend Dr. W. W. Rees uses kerosene-oil and prefers it to every thing else. I have had no experience with it, but am favorably impressed with the recommendation. The popular application of snuff and tobacco I regard as dangerous. Blisters are intolerable.

Proposition XIII.—Let the diet be meat, broths, and milk, or milk-punch and wine-whey. Give water *ad libitum*.

Remarks.—I only intend to indicate by this proposition that we should sustain the patient. As an inflammatory affection it is of slight extent, and all experience goes to show that powerful antiphlogistic remedies are of no avail. On the contrary, an element of asthenia is often manifest at an early stage.

The amount of stimulation and support necessary must of course be left to the judgment of the physician in each case. Children at the breast should generally depend upon their natural aliment, but even with them stimulation is sometimes necessary.

Proposition XIV.—As a rule, I am opposed to topical applications.

Remarks.—Dupuytren, Trousseau, Guiet, Bouchut, Ware, Eben Watson, Gottstein, and many others have applied and recommend a solution of nitrate of silver, forty or sixty grains to the ounce of distilled water. Horace Green, of New York, was the first to insist upon its introduction into the larynx. It has little or no effect directly upon false membrane, and must, therefore, to do good, be applied early, that it may exert its alterative influence upon the inflamed surface. Many acids and alkalies have also been used with the probang—the acids hardening and shrinking, and the alkalies softening and dissolving the membranous deposit. Iodine, and the subsulphate and sesquichloride of iron, with their blackening and accumulating presence, have also been used; but I am happy in the belief that the inhalations of the vapors already alluded to render all these distressing expedients not only inexpedient, to use a paradox, but positively harmful.

Proposition XV.—Tracheotomy is unjustifiable, except as a *dernier ressort*, and even then it is generally a forlorn hope.

Remarks.—I do not doubt that lives have been saved by it, yet I strongly suspect, though I dare not assume, that an equal number have been destroyed by it. It has many advocates and defenders, while very few say any thing in its detraction. I shall, therefore, speak the more earnestly, because I know not who are to be my supporters. Jacobi says, "The omission of it is homicide." Some of its most enthusiastic friends are named among the following statistics of the operation, which are all that I have been able to lay my hand upon:

	Operation.	Recov.	Deaths.
Bretonneau,	20	6	14
Trousseau,	150	39	111
Lothar Voss,	43	9	34
Waldemar von Roth,	48	11	37
Krackowizer,	56	15	41
Jacobi,	62	13	49
Gilfillan,	3	2	1
George Buchanan (Glasgow),	26	9	17
	408	104	304

Eberle says, "All experience has decided against tracheotomy."

Dickson has little faith in it, and Dr. Frank H. Hamilton no more than I, as he himself has told me.

Ryland says: "With regard to the general results of tracheotomy when performed for the cure of croup, I have no hesitation in saying that they are so unfavorable as to warrant us in the strongest condemnation of it, under almost every conceivable circumstance." Dr. Cheyne contends, and his argument applies to a certain proportion of cases, "that death does not occur because there is an insufficiency of air admitted into the lungs to effect the arterialization of the blood, for," he says, "three eighths of the aërial canal is always open, constituting a space quite sufficient for the transmission of all the air necessary to the maintenance of the process of respiration." Dr. Eben Watson, of the Glasgow Royal Infirmary, sums up his experience in the following words: "Tracheotomy should on no account be performed during the exudative stage of croup; for

it is either useless in the worst cases, or positively hurtful in those where there is any hope of recovery." In an excellent article contributed by this Society to the Society of the State of New York in 1863, Dr. William Gilfillan says: "Tracheotomy is an operation in which every thing is to be gained and *nothing can be lost.*" The italics are his own. And yet in this very communication he enumerates "certain causes of death which are incident to the operation," and, of those causes of death which arise subsequent to the operation, "some," he says, "spring from the operation, and some are accidental."

I quote again: "Hæmorrhage during the operation may cause death, or greatly weaken the already depressed vital powers;" again, "Hæmorrhage into the trachea may cause obstruction of the respiration, or even suffocation." Of course he gives directions for avoiding these accidents as far as possible. Yet the fact, that they may occur, shows that the operation is one in which life may be jeopardized beyond the risks incident to the disease itself. Again, we are told that the proper introduction of the canula "is a nice point and only to be acquired by practice." Again: "It is a matter of vital importance that the tube inserted, and through which the patient respires, should be as large as possible. . . . . Trousseau first drew attention to this point, that many persons died after tracheotomy, from the tube introduced being too small to permit air enough to enter the lungs for the oxygenation of the blood."

Another fact which Dr. Gilfillan records (and I do not question the accuracy of any of his statements) is, that "the lungs" are sometimes "affected by the direct admission of cold air, and pneumonia and bronchitis follow." He says also: "After every case of tracheotomy, there is, I think, more or less bronchitis when the patient survives the first few hours." "A more serious form of the disease may occur, or pneumonia may arise." After these dangers are past, he tells us, very truly, that our next solicitude will have reference to the removal of the tube. "If this is not done soon, the larynx from disuse contracts so as to be too small for respiration." He says (and who will question it?) that "it is a grievous affliction

to be condemned to breathe through a canula for the term of one's natural life." I have known a case, Mr. President, in which every attempt to get rid of the tube was attended with such serious symptoms, that it was worn for twelve years, and then I lost sight of the patient.

On the other hand, it occasionally happens that the tube creates so much irritation that it has to be dispensed with from the first; in which case, unless we can keep the wound open by means of a simple wire dilator, such as Marshall Hall describes in *Braithwaite's Retrospect*, part xxxv., we can, of course, expect no benefit from the operation.

The advocates and champions of tracheotomy are constantly urging us to operate earlier, that we may have a larger percentage of recoveries. Now, to my mind, the only justification for this operation is in its use when all else has most signally failed. Even then, it is hardly safe to assume that the few cases which recover are saved by it, for no practitioner of experience can have failed to see cases recover without operation, after all hope had been relinquished. Indeed, I cannot help recognizing the probability that some of the fatal cases after operation would have recovered, but for the additional risk incurred by it.

Now, I have no doubt that, by resorting to tracheotomy at an earlier stage of the disease, we should have a greater apparent success. We should, of course, include a greater number of those cases which would recover if let alone; and a sufficient percentage of these would live in spite of both disease and doctor, to increase very considerably the proportion of successful operations. When the enthusiastic advocates of tracheotomy succeed in persuading the whole profession to operate early, we may be very proud of the record, as we read recoveries forty per cent. instead of twenty as now, but who shall answer for the other sixty, thirty of whom would have recovered but for rash interference?

Operate early? Why, Mr. President, there was never a more dangerous exhortation. You cannot *early* know that there is any necessity for such an act. It is admitted by the most zealous operators that death may occur as a direct consequence of tracheotomy—by syncope from hæmorrhage, by

suffocation from hæmorrhage, by a tube too small, by irritation, by bronchitis, by pneumonia—and we may increase the list by reference to all those accidents which are occasioned by the struggling of the patient, and by the constant moving up and down of the part to be operated on (unless well secured by the hook). These accidents I need not dwell upon, nor need I claim that they are unavoidable; the œsophagus and the pleura have been opened in this way.

Again, is it not probable that many a child has died because of the greater quantity of oxygen required, while, under violent exercise and fright, striving to escape the operation?

In view of these undoubted facts, have we any right or reason to assume that the *one* out of *four* or *five*, who has lived through this ordeal, was saved by it? Indeed, have we not reason to suspect that, if all the cases which have been submitted to the knife had been mildly treated without it, we should have had from fifteen to twenty per cent. more of recoveries.

I close this paper, which has already far exceeded the limit which I prescribed to myself, with a report of all the fatal cases of croup which I have seen during the last three years:

Case I.—A little German boy, four years of age, living in Atlantic Street, became hoarse May 16, 1869, but was allowed to run about as usual, in and out of doors. May 17th, was so much worse that his parents vomited him profusely with ipecac. and purged him with oil. Steadily the disease advanced, till, on the 18th, Dr. Skene was called. He found the patient weak; pulse rapid; breathing short and laborious; countenance anxious; skin and lips slightly livid. He ordered, at once, the plan of treatment sketched in this paper. This treatment was rather inefficiently carried out till the child died, on the twenty-fourth day from the seizure.

I was in consultation from the second day, and this is the first case of croup which I have seen die in over three years. I report it, because it confirms my views of the proper treatment of croup, as certainly as did the recovery of all the other cases. A powerfully perturbing treatment was instituted here before the doctor was called. A nauseant and emetic was given, with all its prostrating effect; the lungs were filled with mucus, which the child had no power to throw off; the alimentary canal, from one end to the other, was irritated and

excited to such peristaltic action as would necessarily disturb every natural function. The child grew rapidly worse after the emetic. The breathing was much relieved by the subsequent treatment, and *finally the death* was *more* from asthenia than apnœa. On the day before his death an accident occurred in the treatment, which should be mentioned, though I suppose it did not alter the result. The nurse gave a teaspoonful of turpentine instead of lime-water, and, being frightened, ran to the nearest apothecary, who directed a teaspoonful of sweet oil. Some irritation of the bladder and urethra was the consequence.

Case II.—Lizzie C., aged four years; hoarse several days; really no other symptom, except an occasional slight, croupy cough; bright, playful; appetite good; skin natural; tongue moist; patient but little disturbed at night. On the third day, toward evening, exacerbation of all the symptoms, with profuse coryza. Difficulty of breathing increased through the night, but was not very great till the morning of the fourth day. Dr. Mitchell saw her at 9 A. M., and advised twenty grains of calomel in addition to my usual treatment. Steadily the symptoms progressed. The amount of air which entered the chest was enough to sustain any child, if the processes of endosmose and exosmose had not been prevented by the condition of the mucous membrane in the air-cells; and yet no bronchitis was discoverable by any physical sign. She died, not from laryngeal obstruction, but from want of power in the lungs to absorb oxygen and emit carbonic-acid gas. There was no struggle during the last two hours, but a gradual sinking, such as you would expect, as the effect of carbonic acid upon the brain.

This was no ordinary case of croup, as the sequel showed, for six days later an aunt, in the same house, had a severe attack of diphtheria; then the grandmother, also in the same house, had acute laryngitis, losing her voice entirely; and in less than another week a cousin in the same house had well-marked scarlatina. They all recovered.

A fatal case of laryngo-tracheitis having occurred under my observation, since the reading of the above paper, I append it here:

I was invited on Tuesday, the 14th instant, to see a little daughter of Dr. Caldwell, who is an active member of this Society. The patient was three years of age, and of good constitution.

I learned that, for about ten days, she had suffered with subacute bron-

chitis, of not very severe character, yet sufficiently grave to have been under treatment much of the time. Had vomited several times, as the effect of ipecacuanha, and had taken as an expectorant a mixture of squills, ipecac., tolu, and ammonia. Castor-oil was given as a cathartic once or twice, and her chest was enveloped in oiled silk. At three o'clock on the morning of the 14th, symptoms of laryngitis declared themselves—croupous cough, labored perspiration, and marked aphonia. The expectorant mixture was now given, and occasioned free emesis. A dose of castor-oil was also administered, which operated late in the day. Flaxseed and mustard poultices were applied to the chest, and flannels wet with liniment about the neck. I first saw her ten hours after the attack. She was profusely catarrhal, and continued so all the afternoon. Both lungs were loaded with mucus, at times producing loud mucous *râles*. I recommended the plan of treatment which I have detailed to you, but had little faith in the efficacy of any plan that could be adopted. The preceding and accompanying bronchitis had called for and received a course of treatment which I believe to be injurious in croup. I am not criticising the course pursued; it was orthodox, and the croup could not be anticipated. Drs. Byrne, Whaley, and Shuttleworth, all saw the case, and made valuable suggestions, but gradually the little sufferer sank, apparently expanding sufficiently the chest, and receiving air enough, but for the wall of mucus between it and the blood.

I have not thought it worth while to report successful cases, because it is almost essential to *see* a case of croup in order to judge of its importance or significance. The following will suffice to illustrate a class of cases which I think are not only saved from suffocation, but are prevented from reaching that stage of deep distress with which we are all too familiar:

Harry H., Schermerhorn Street, November 25, 1869, was taken sick with feverishness and slightly croupy cough; grew worse in the night, and on the morning of the 26th was profusely vomited with syrup of ipecac.; but no improvement took place. At 11 A. M. I was sent for, and from that time until evening the dyspnœa was of that persistent character which marks the generally fatal case. I administered at once a ten-grain dose of the bromide of potassium, and put in requisition all the other means set forth in the above paper. A peck of lime was slacked lump by lump, in an open wash-bowl. Half a teaspoonful of lime-water was taken every half-hour. The carbolic acid and glycerin mixture (equal parts), one teaspoonful to half a pint of boiling water, also gave off its vapor every three hours, and at 9 o'clock P. M. we felt that the prospect for recovery was good. The *bromide* was continued in five-grain doses every six hours, and in all other respects the treatment, through that night and the next day, was as at first. The convalescence was gradual but uninterrupted.